

## CLAIMS

What is claimed is:

Claim 1 - A paint ball loading and firing apparatus comprising in combination:

a source of compressed gas;

an elongate firing chamber having a barrel at a first end for release of a fired paint ball and a removable back plug at a second end opposite said first end;

a paint ball loading hole in said firing chamber, said loading hole located between said back plug and said barrel; and

a selectively openable gas path between said source of compressed gas and said firing chamber.

Claim 2 - The apparatus of Claim 1 wherein a door is located adjacent said loading hole, said door having an open position with said loading hole exposed to allow a paint ball to pass into said firing chamber and a closed position with said door blocking passage of paint balls into said firing chamber.

Claim 3 - The apparatus of Claim 2 wherein said door is controlled so that said door is restricted to said closed position when said selectively openable gas path is opened and compressed gas enters said firing chamber.

Claim 4 - The apparatus of Claim 3 wherein said door slides between said open position and said closed position within a door slot, said door slot restricting said door to sliding motion between said open position and said closed position.

Claim 5 - The apparatus of Claim 4 wherein said door has beveled rails along lateral edges thereof and wherein said door slot of said loading hole has beveled surfaces, said beveled surfaces of said door slot spaced apart a similar distance from each other as said rails of said door are spaced from each other, with said rails beveled in a direction keeping said door adjacent said firing chamber.

Claim 6 - The apparatus of Claim 5 wherein said door has a base end most distant from said firing chamber and a tip opposite said base end, said door having a width

between said rails which tapers toward said tip; and

wherein said door slot of said loading hole tapers to a lesser width at a side of said door slot most distant from said base end of said door.

Claim 7 - The apparatus of Claim 6 wherein said door includes an under bevel on a surface of said door adjacent said base end, said under bevel angling such that when a force is applied to said under bevel in a direction non-parallel with a direction of said door, said door is caused to move from said closed position to said open position.

Claim 8 - The apparatus of Claim 7 wherein at least one spring is interposed between said base end of said door and a portion of a housing in fixed position relative to said firing chamber, said spring biasing said door toward said closed position.

Claim 9 - The apparatus of Claim 8 wherein said door has a top surface opposite said under bevel with a concave depression therein, said concave depression increasing in depth as said concave depression extends toward said tip, a radius of curvature of said concave depression similar to a curvature of a paint ball.

Claim 10 - The apparatus of Claim 2 wherein a trigger is provided which is manually toggleable by a user, said trigger configured to move a unity bracket controlling flow of compressed gas along said gas path and controlling movement of said door between said open position and said closed position.

Claim 11 - The apparatus of Claim 10 wherein said trigger manually adjusts flow of compressed air through a 3-way valve with compressed air flow from said 3-way valve controlling a position of a ram including a piston traveling within a cylindrical blind bore, said piston of said ram coupled to said unity bracket for control of a position of said door and gas flow along said gas path.

Claim 12 - The apparatus of Claim 2 wherein a charge chamber is located along said gas path, said charge chamber having at least one selectively closable opening, said charge chamber having a volume sufficient to store an amount of compressed gas sufficient to fire a paint ball out of said firing chamber.

Claim 13 - The apparatus of Claim 1 wherein said selectively openable gas path includes an activator including at least one valve thereon having an open position and a closed position, said activator having a position controlled by a manually actuatable trigger.

Claim 14 - A paint ball marker, comprising in combination:

a grip;

a trigger;

a compressed gas source;

a firing chamber, said firing chamber being hollow between a back plug and a barrel through which a paint ball is fired;

a gas path extending between said compressed gas source and an entrance into said firing chamber, said gas path including at least one valve thereon, said valve at least partially controlled by said trigger; and

a loading hole in said firing chamber forward of said back plug, said loading hole passing laterally into said firing chamber, said loading hole at least as large as a paint ball to be fired out of said firing chamber.

Claim 15 - The marker of Claim 14 wherein said valve in said gas path is an activator valve driven by a ram having a piston residing within a blind bore, said blind bore having air pathways on either side of said piston leading to a 3-way valve coupled to said trigger, with said trigger movable to move said ram piston and said activator valve.

Claim 16 - The marker of Claim 14 wherein a charge chamber is located along said gas path, said charge chamber having at least one port for accessing said charge chamber, said at least one port selectively openable and closable such that a charge of compressed air can be stored within said charge chamber, said charge chamber having sufficient size to contain a charge of compressed gas sufficient to fire the paint ball out of said firing chamber.

Claim 17 - The marker of Claim 16 wherein an activator valve is provided which

selectively charges and discharges said charge chamber, said activator valve controlled by movement of said trigger.

Claim 18 - The marker of Claim 14 wherein a door is located adjacent said loading hole, said door having an open position and a closed position.

Claim 19 - The marker of Claim 18 wherein said marker includes a ram within a cylindrical blind bore having a piston slidably located therein, said piston controlled by compressed gas from said compressed gas source selectively supplied to said blind bore by movement of said trigger, said piston coupled to a rod which is arranged to control movement of said door between said open position and said closed position.

Claim 20 - The marker of Claim 19 wherein said door includes a beveled surface, said door located within a door slot formed in said firing chamber adjacent said loading hole, said door slot shaped and sized to accommodate sliding of said door between said open position and said closed position, a loading slide having a beveled end which resides within a slide slot non-parallel with said door slot and adjacent said door, said beveled end having a slope which co-acts with said beveled surface of said door when said beveled end of said loading slide abuts said beveled surface of said door to cause said door to move from said closed position to said open position, said loading slide coupled to a unity bracket, said unity bracket also coupled to said rod of said ram, such that said loading slide is caused to move when said rod is caused to move by said trigger.

Claim 21 - A paint ball loading and firing system, comprising in combination:

- a cylindrical firing chamber having a closed end and an open end;

- a loading hole in a cylindrical wall of said firing chamber for passage of a paint ball into said firing chamber; and

- a compressed air entrance into said firing chamber, said compressed air entrance located between said loading hole and said closed end.

Claim 22 - The system of Claim 21 wherein a diameter of said firing chamber is

approximately equal to a diameter of a paint ball to be fired out of said firing chamber.

Claim 23 - The system of Claim 21 wherein a door is provided adjacent said loading hole, said door restricted to sliding motion relative to said loading hole in a direction non-parallel with a central axis of said firing chamber.

Claim 24 - The system of Claim 23 wherein a paint ball feed tube is located on a side of said door opposite said loading hole when said door is in said closed position.

Claim 25 - The system of Claim 24 wherein said door is held tight against said cylindrical wall of said firing chamber adjacent said loading hole when said door is in said closed position.

Claim 26 - The system of Claim 25 wherein said cylindrical wall includes a door slot adjacent said loading hole which is beveled along lateral sides of said door slot, said door having rails along sides thereof which are beveled complementally with beveled lateral sides of said door slot, such that said door slot holds said door against movement away from said central axis of said firing chamber.

Claim 27 - The system of Claim 26 wherein said lateral side edges of said door slot are tapered and said rails of said door are tapered toward a tip of said door which travels the furthest along said door slot, said rails of said door tapering complementally with said door slot such that said door seals tightly against said door slot and said loading hole when said door is in said closed position.

Claim 28 - The system of Claim 27 wherein said door slot and said loading hole are sufficiently close to said central axis of said firing chamber that said door extends slightly into said firing chamber when said door is in said closed position, said door extending sufficiently into said firing chamber to pinch a paint ball between said door and said cylindrical wall of said firing chamber at a location opposite said door, such that said paint ball is retained from falling out of said open end of said firing chamber when said open end of said firing chamber is oriented below said closed end of said firing chamber.